

Claims:

1. A process for the fabrication of a metallic component, comprising:
providing an object having surface;
performing a first electroforming operation, thereby forming a first metallic layer comprising a metallic material on said surface;
forming a first mask layer on the first metallic layer, the first mask layer comprising a non-conductive material;
patterning the first mask layer, thereby providing a plurality of first recesses in the first mask layer from which the non-conductive material above the first metallic layer is removed, said first recesses having a dimension of elongation;
performing second electroforming operation using said metallic material whereby said first recesses are filled with said metallic material and a second metallic layer is formed comprising said metallic material extending at least a first predetermined thickness above, and entirely or partially over the surface of, said first mask layer.
2. The process of claim 1, wherein the object comprises (A) a substrate and said surface comprises a flat or substantially flat surface of the substrate, or (B) a shaped mandrel, the mandrel defining (for example in negative) said surface, the surface being for example cylindrical, conical, parabolic, hyperbolic, elliptical or spherical.
3. The process of claim 1 or 2, further including:
machining said second metallic layer to form a uniformly thick second metallic layer, said second metallic layer thereby having an upper surface.
4. The process of claim 3, further including:
removing the object and removing the non-conductive material of the first mask layer, thereby producing a metallic component having first elongate channels extending therein where the non-conductive material has been removed.
5. The process of claim 3, further including:
forming a second mask layer on the upper surface of the second metallic layer, the second mask layer comprising a non-conductive material;
patterning the second mask layer, thereby providing a plurality of second recesses in the second mask layer from which the non-conductive material above the second metallic layer is removed, said second recesses having a dimension of elongation;
performing a third electroforming operation using said metallic material whereby said second recesses are filled with said metallic material and a third metallic layer is formed comprising said metallic material extending at least a second predetermined thickness above, and entirely or partially over the surface of, said mask layer.

6. The process of claim 5, further including:
machining said third metallic layer to form a uniformly thick third metallic layer, said third metallic layer thereby having an upper surface.
7. The process of claim 6, further including:
removing the object and removing the non-conductive material of the first mask layer and the second mask layer, thereby producing a metallic component having first elongate channels extending therein where the non-conductive material of the first mask layer has been removed and having second elongate channels extending therein where the non-conductive material of the second mask layer has been removed.
8. The process of claim 7, wherein:
the step of patterning the first mask layer and/or the step of patterning the second mask layer are performed such that
- (a) the first recesses are wider than the second recesses, or vice versa; and/or
 - (b) the first elongate channels are wider than the second first elongate channels, or vice versa; and/or
 - (c) the first elongate channels and/or the second first elongate channels taper in width or in thickness along their respective directions of elongation; and/or
 - (d) the direction of elongation of the first elongate channels is at an angle to that of the second first elongate channels, for example at right angles; and/or
 - (e) the first elongate channels and/or the second first elongate channels are provided with projections, sidewall recesses and/or baffling, whereby non-linear flows through such channels may be achieved.
9. The process of claim 7, wherein:
the steps of performing a first electroforming operation, forming a first mask layer, patterning the first mask layer, and performing second electroforming are performed such that the first metallic layer, the first mask layer and the second metallic layer extend over a predetermined first two-dimensional area; and
the steps of forming a second mask layer, patterning the second mask layer and performing a third electroforming operation are performed such that the second metallic layer, the second mask layer and the third metallic layer extend over a predetermined second two-dimensional area;
wherein the second two-dimensional area is larger than the first two-dimensional area.
10. The process of any of the preceding claims, wherein the first electroforming operation is performed such that the thickness of the first metallic layer is about 100 to 200 μm .
11. The process of claim 3, and any claim dependent thereon, wherein said second electroforming operation is performed such that said predetermined thickness is at least as thick as the thickness of

the first metallic layer, and said machining step comprises machining the second metallic layer to a thickness equal to or about equal to the thickness of the first metallic layer.

12. The process of any of the preceding claims, wherein said first electroforming operation is performed for an extended period, whereby the thickness of the first metallic layer is at least as large as the thickness of the first mask layer, and is for example 1-2mm or more.
13. The process of any of the preceding claims, wherein said second electroforming operation is performed for an extended period, whereby the thickness of the second metallic layer is at least as large as the thickness of the first mask layer, and is for example 1-2mm or more.
14. The process of any of the preceding claims, wherein the step of forming a first mask layer comprises coating the first metallic layer with said non-conductive material to a thickness of 1-2mm.
15. The process of claim 5, and any claim dependent thereon, wherein the step of forming a second mask layer comprises coating the second metallic layer with said non-conductive material to a thickness of 1-2mm, or to a thickness greater than the thickness of the first mask layer.
16. The process of any of the preceding claims, wherein the step of removing the object and/or removing the non-conductive material comprises dissolving said non-conductive material in a solvent or melting said non-conductive material.
17. The process of any of the preceding claims, wherein the object is a metallic component, for example made of steel, copper or bronze.
18. The process of any of the preceding claims, wherein the metallic material used in the electroforming is nickel, copper, cupronickel, nickel containing ceramic powder, or copper containing ceramic powder, or an alloy containing iron and/or cobalt.
19. The process of claim 18, wherein the metallic material used in the second electroforming operation is different to the metallic material used in the first electroforming operation, and/or the metallic material used in the third electroforming operation is different to the metallic material used in the second electroforming operation.
20. The process of any of the preceding claims, wherein the non-conductive material used in the steps of forming a first mask layer and/or forming a second mask layer comprises a low melting point polymer, for example poly(methylmethacrylate) (PMMA) or microcrystalline wax.
21. A metallic component obtainable by the method of any of the preceding claims.